THE EFFECT OF POLICIES ON FOOD SECURITY AND RURAL DEVELOPMENT IN SOUTH AFRICA

SHERYL HENDRIKS, JOHANN KIRSTEN AND NICK VINK*

ABSTRACT

Shifts in agricultural policy over the past two decades, and farmers' reactions to these shifts, have not undermined national food security, yet many South Africans do not live lives free of food insecurity. A review of the empirical literature shows that agricultural production must develop beyond the subsistence level to have a significant impact on the food security and nutritional status of rural people. To this end, there are four conditions necessary for reaping benefits from agriculture in South Africa's rural communities. First, benefits from agriculture are most likely only to accrue if the supply of nontradables is price elastic. Second, incentives are needed to encourage households to participate in production of farm tradables. Third, it is necessary to ensure that markets exist for the sale of smallholder produce. Fourth, the nutritional benefits of agriculture will only remain positive if the dietary changes that do occur comply with dietary guidelines.

INTRODUCTION

A report commissioned by the National Agricultural Marketing Council (ECI, 2001) showed that shifts in agricultural policy in South Africa over the past two decades, and farmers' reactions to these shifts, have not undermined the sector's ability to provide national food security to the country as a whole. Nevertheless, many South Africans do not have the privilege of a life free of food insecurity. The purpose of this article is to review the relevant literature on the relationship between agriculture and poverty, and to draw conclusions regarding the role of smallholder agriculture in providing household food security.

To this end, the relationship between smallholder agricultural production and poverty is reviewed first. This is followed by an assessment of the economy-wide effects of growth in smallholder agricultural production, and, third, by an analysis of smallholder agriculture's potential contribution to household food security.

*Sheryl Hendriks is Coordinator: Food Security Programme, University of KwaZulu-Natal, Johann Kirsten is Chair: Department of Agricultural Economics, Extension and Rural Development, University of Pretoria, and Nick Vink is Chair: Department of Agricultural Economics, University of Stellenbosch.

AGRICULTURAL PRODUCTION AND POVERTY

In 1998, a consortium of researchers revisited some 1100 households first surveyed in the KwaZulu-Natal province as part of the well-known Project for Statistics on Living Standards and Development (PSLSD) undertaken by SALDRU in 1993. The KwaZulu-Natal Income Dynamics Study (KIDS)[1] is a panel study that offers unique insight through the collection of survey data over a 5-year period spanning South Africa's transition, the introduction of policies intended to reduce poverty, as well as the beginning of rapid HIV/AIDS infection.

These data show the relationship between participation in agricultural production, poverty, and mobility. For example, in 1993 it was estimated that there were some 960000 African and Indian households in KwaZulu-Natal. Of these, about a third (367000) had undertaken some form of agricultural activity in the preceding twelve months. Between 1993 and 1998 an additional 199000 households entered agricultural production, increasing the proportion of African and Indian households involved to 49 percent [2]. Thus, just over half (50.5 percent) of the households that had been involved in agricultural production in either 1993 or 1998 had performed this activity in both years, 11 percent had been involved in 1993 only, and 38 per cent were involved in 1998 only. These last two groups may be described as transitory agricultural producers.

The results suggest relative stability over the five-year period, with 81 percent of households producing in 1993 still involved in agricultural production in 1998: by contrast, only 17 percent of those involved in the informal sector in 1993 were still involved in 1998. Indeed, agricultural production emerges as the destination of almost half of these 'dissatisfied' informal sector producers. Of those who moved from informal production to agricultural production, 34 percent were categorised as 'structurally downward' and 24 percent as 'structurally poor' suggesting that this group came to view agricultural production as a more viable option for poverty reduction .[3]

These data also suggest that households involved in agriculture in one or both periods are less likely to be in the poorest categories. While 24 percent of rural households that had never engaged in agriculture received incomes that were less than

[1]May. *et al*... (2000) provides a fuller account of the KIDS methodology and the limitations of the study, while May and Roberts (2001) review the design and use of panel data with respect to the South African context. This section is based on contributions of May to the ROA project (see Kirsten, 2003)

[2]Given the nature of the panel study, the 1998 data cannot be generalised to the whole population since any new households that might have formed between the surveys are excluded. However this analysis gives an indication of the scale of involvement in agriculture.

[3]Given the low barriers of entry that are said to categorise informal work, it seems unlikely that these households were forced to abandon this work due to their being unable to meet input costs.

half their threshold, this proportion declines to 21 percent of those that were transitory agricultural producers, and 18 percent of those who produced in both periods. In fact, only 33 percent of those who never produced fell above the threshold income, while 40 and 43 percent of those transitorily or permanently involved in agriculture were above the threshold .[4]

The mean monthly income of farming households fell from R97 in 1993 to R72 in 1998 (in 1993 prices). Although small, if this contribution is removed from total income of households, the proportion of households involved in agricultural production who were below the poverty threshold increases from 31 percent to 38 percent in 1993 and from 42 percent to 50 percent in 1998. This suggests that although the amounts are comparatively modest, agriculture production did enable a significant proportion of households to remain above the poverty threshold.

THE ECONOMY-WIDE EFFECTS OF AGRICULTURAL GROWTH

Given the widespread practice of agriculture in South Africa, it is reasonable to assume that encouraging agriculture-led growth would have widespread benefits for both farm and non-farm rural households, which may spill over to urban populations, for example through lower food prices (Hazell and Röell, 1983; Hazell and Haggblade, 1993). Appropriate policy choice rests on knowing how much increased employment can be supported by increased food supplies, the types of employment possible from alternative production technologies, and the efficiency of various policies, strategies, investments and other support measures that stimulate production of tradable commodities and increase the price elasticity of nontradable output supply (Mellor, 1976; de Janvry, 1994).

To this end, a case study typical of agriculture in South Africa is presented below to illustrate the extent of such linkages. In this case study, the effect of the Comprehensive Agricultural Support Programme (CASP) on smallholder farmers in rural KwaZulu-Natal is analysed. The CASP, a new programme aimed at providing support services (credit, input supplies, infrastructure, access to markets, etc.), is in the process of being implemented by provincial governments throughout the country, with funds provided by the national Department of Agriculture.

This case, based on Hendriks and Lyne (2003a), sets out to determine the potential for agriculture-led growth by estimating the size of growth multipliers in two poor rural

[4] In all cases chi square tests indicate that the groups are statistically different.

areas, and to suggest some necessary conditions under which agriculture-led growth could reduce poverty and improve food security in these areas.

Ninety-nine rural households were surveyed during the latter half of 1997, 49 in Swayimana and 50 in the Umzumbe district, in KwaZulu-Natal province. The results of the expenditure analyses show there is little possibility of income-induced growth in the demand for food, except for horticultural products, and to a lesser extent for meat, meat products and poultry. For these two categories, the expenditure elasticities indicate likely demand growth as income increases, especially for horticultural products.

Households in both districts would increase their expenditure on durable items (furniture and appliances) substantially, should incomes rise (expenditure elasticities of 2.17 and 2.20 were estimated for Swayimana and Umzumbe respectively). This suggests that the demand for imported consumer durables may grow faster than the demand for locally produced commodities when incomes rise, directing part of any additional income out of the local economy, a leakage that will tend to lower the strength of rural growth linkages. Both districts showed a strong positive elasticity for housing expenditure (2.46 and 2.72 for Swayimana and Umzumbe respectively). This has positive implications for the local economy as building materials (e.g. concrete blocks), construction and repair services tend to use local resources, especially labour. Elasticities for social obligations were low (0.31 and -0.29 respectively), while the estimated expenditure elasticities for transport were very high in both districts (8.30 for Swayimana and 2.52 for Umzumbe). Wealthier and poorer households display similar expenditure behaviour for most products, but the demand growth generated by poorer households for durables, housing and horticultural products is greater than for wealthier households.

The results of the expenditure analyses for farm and non-farm tradables and nontradables are presented in Table 1. Although expenditure on farm tradables comprises the largest portion of household expenditure, estimated expenditure elasticities are positive but less than unity (0.53 for the relatively poorer and more remote Swayimana households, and 0.41 for Umzumbe households), suggesting that increases in consumption are proportionally smaller than increases in household income, ceteris paribus. The district expenditure elasticities for nontradable farm goods suggest that increases in consumption are proportionally larger than increases in household income with expenditure elasticity estimates of 1.23 and 1.22 for Swayimana and Umzumbe respectively. This reinforces the earlier finding that demand growth for meat, meat products and poultry, and exceptional demand growth for

horticultural products follows an increase in household incomes. Increased demand for these currently demand-constrained nontradable farm goods could therefore generate higher turnover and employment on local farms.

The consumption of tradable non-farm commodities in the study districts is very income elastic (estimated expenditure elasticities of 2.59 and 1.94 for Swayimana and Umzumbe respectively). This finding is entirely consistent with other South African studies (Nieuwoudt and Vink, 1989; van Zyl, *et al.*. 1991) showing that rural households are twice as likely to spend additions to income on commodities other than food. Expenditure elasticities estimated for nontradable non-farm commodities are also elastic but lower than for tradable non-farm commodities (1.47 and 1.24 for Swayimana and Umzumbe respectively). These results suggest some potential for income-induced growth in the local economy, mainly through greater demand for local housing materials, building and repair services, transport, and catering and hospitality services.

Table 1. Results of the district expenditure analysis, Swayimana and Umzumbe, 1997

	Swayimana (n = 46)					Umzumbe (n = 47)				
Expenditure category	F-statistic	Observed ABS	Estimated ABS	Estimated MBS	Elasticity	Observed ABS	Estimated ABS	Estimated MBS	Elasticity
Farm tradables	2.719	0.64	0.65 *15.93*	0.34 *27.08*	0.53 *88.49*	0.53	0.53 *19.24*	0.22 *42.18*	0.41 *85.60*
Farm nontradables	1.827	0.09	0.10 *1.48*	0.12 *7.55*	1.23 *3.08*	0.05	0.05 *2.83*	0.06 *14.47*	1.22 *6.00*
Non-farm tradables	3.549	0.15	0.15 *8.70*	0.37 *70.52*	2.58 *76.98*	0.30	0.29 *4.32*	0.57 *46.53*	1.94 *64.15*
Non-farm nontradable	2.274	0.12	0.12 *3.71*	0.17 *19.16*	1.47 *8.27*	0.13	0.12 *3.44*	0.15 *21.15*	1.24 *15.29*

Note: Figures in italics are t -statistics for the null hypothesis that the pred icted average and marginal budget shares are zero and that the expenditure elasticity is unity.
ABS: Average Budget Share, MBS: Marginal Budget Share
Source: Hendriks and Lyne, 2003a

The estimated expenditure elasticities for each category of commodities did not differ much between districts or wealth groups. Reasonably strong growth linkages seem possible, driven mainly by increased local demand for farm nontradables and non-farm nontradables. However, these linkages are likely to be weakened by increased

expenditure on non-farm tradables, a leakage from the local economy. Since the estimated marginal budget share did not differ much between districts or wealth groups in this study, growth linkages in the communal areas of KwaZulu-Natal are less likely to depend on location or on which rural households receive increased incomes.

The estimated growth multipliers are presented in Table 2. These show the resultant additions (from consumption and production of farm and non-farm nontradables) to gross income of local households following an initial income shock of one South African Rand. The study results show that a R1.00 increase in the income of the entire sample could lead to R0.09 and R0.19 of additional income from spending on farm and non-farm nontradables respectively. The multiplier (1.00 + 0.09 + 0.19 = 1.28) implies total value added from spending on these demand constrained items of R0.28.

Table 2. Growth multipliers for Swayimana and Umzumbe, 1997

Commodity	Whole sample	Swayimana	Umzumbe	Wealthier Decile	Poorer Households
Tradables	1.00	1.00	1.00	1.00	1.00
Value added from farm nontradables	0.09	0.12	0.06	0.10	0.09
Value added from non-farm nontradables	0.19	0.20	0.18	0.21	0.18
Multiplier	1.28	1.32	1.24	1.31	1.27

Source: Hendriks and Lyne, 2003b

The total value added by a R1.00 income shock in Swayimana households is R1.32 for farm and non-farm tradables, slightly higher than the R1.24 estimated for the less remote Umzumbe households. The multiplier for the wealthier income group is only four cents higher than the multiplier for the poorer households, implying negligible difference between income groups with regard to the way in which they would spend additions to income. Distance from urban centres appears to have more influence on consumption than relative wealth in these rural areas.

The multipliers estimated in this study are slightly lower than Belete, *et al.*'s. (1999) estimate of 1.35 for a sample of food plot farmers in the Eastern Cape Province, and 35 percent lower than Ngqangweni's (2000) estimate of 1.98 for the local economy of Middledrift in the Eastern Cape.

The expected value added from farm nontradables is roughly half that from non-farm nontradables. This finding is consistent with Ngqangweni's (2000) results for

Middledrift (Eastern Cape Province), which showed R0.35 and R0.63 of additional income from farm and non-farm nontradables respectively. However, the estimates are lower relative to those from other sub-Saharan African countries (Delgado, *et al.*. 1998), where the farm contribution is usually larger than the non-farm contribution.

Overall, the results suggest that rural incomes could grow by an additional 28 cents in KwaZulu-Natal following an initial income shock of R1.00 with most of this growth coming from the non-farm sector. Although this does not represent a particularly strong growth linkage, it is clear that increased incomes could generate additional growth through consumption linkages. The results raise two important policy issues. First, the multiplier only indicates potential growth linkages because the supply of nontradables may not be perfectly elastic. Second, while potential growth linkages are driven by nontradables, these nontradables are unlikely to generate the initial income shock, as they are demand constrained.

AGRICULTURE'S CONTRIBUTION TO HOUSEHOLD FOOD SECURITY

In assessing the food security role of agriculture, the focus should properly be on the potential for nutritional benefits from increased agricultural production in the former homeland areas of South Africa. Knowing the likely impact of increased income on household consumption patterns is key to estimating the likely benefits of increased income on consumption of a range of food and non-food products. Moreover, knowing how expenditure will influence the demand for agricultural production with direct benefits for the wider population is vital for anticipating the nutritional impact (an indirect measure of food insecurity) of increased agricultural production and/or agriculture-led growth in South Africa (Hendriks, 2003).

A review of recent South African nutritional studies

Prior to 1994, no national studies had been conducted to evaluate the nutritional status of the South African populations (VIC, 2001). The first national nutrition study was conducted in 1994, when the South African Vitamin A Consultative Group (SAVACG) conducted an anthropometrical survey of preschool children (Labadarios and Middelkoop, 1995, cited by VIC, 2001). The study showed that 24 percent of South African children were stunted and 9 percent were underweight. Malnutrition was most prevalent in the Eastern Cape, Northern Province and KwaZulu-Natal. One third of the sampled children had marginal vitamin A status (20 g/dl), while approximately 20 percent of the sampled children were anaemic (Hb,11g/dl).

In the absence of national data on the general nutritional status of South Africans, the South African National Nutrition Survey Study Group (Vorster, *et al.*. 1995 cited by Rose, *et al.*. 2002) conducted an extensive literature survey of regional and smaller ad-hoc studies conducted in the country since 1976. It was concluded that 2 - 6 year old non-urban African children had the lowest energy and micro nutrient intakes. The study surmised that the low energy intakes of these children was due to the low consumption of fat and was possibly the cause of the high rate of stunting. A follow-up study was conducted in 1997 to extend the information from various studies and other indicators of nutritional status (Vorster, *et al.*. 1995). Both the 1995 and 1997 surveys were of existing data initiated for a variety of purposes and using diverse sampling and survey procedures (Rose, *et al.*. 2002).

One such smaller study was carried out by Schmidt and Vorster (1995). The study was based on the assumption that people who grow their own vegetables eat more vegetables than those who do not, and therefore the nutritional status of households who grow vegetables is better. The sample consisted of 18 children between the ages of 6 and 13 years whose parents participated in a communal garden in Bophuthatswana (a former South African homeland) and a control group of children from non-participating households. The study participants reported that the main advantages of the garden were that they saved money and had a greater variety of food. However, households only produced 20 percent of their minimum vegetables requirements on the 13 square metre plots they cultivated in the communal garden. The average household required 64 square metres of garden to cultivate sufficient vegetables to meet dietary requirements. Children's diets lacked diversity and were found to vary little between households. Diets were very low in energy and protein. The children seldom ate meat or tinned fish, and ate chicken once a month or less often. None of the participating households ate vegetables every day, while most households reported that they rarely ate fruit. A comparison of the children's anthropometrics, macro and micro nutrient status could not differentiate between the children of households participating in the garden and those from non-participating households.

Schmidt and Vorster (1995) found that households who grew vegetables did not purchase additional vegetables, but used the savings to purchase other foods, such as oil and fat (which did affect biochemical findings). Therefore, vegetable gardens may have an indirect nutritional benefit through household income replacement. However, vegetable gardens are not able to address the need for increased energy consumption desperately needed to overcome the high incidence of stunting among South African children.

Kirsten, *et al.*'s. (1998) study of the nutritional status of rural households is the first local study to link children's (0 - 60 months) nutritional status with agricultural production. Multivariate regressions and a logit maximum likelihood model were applied to agricultural production and anthropometric data from 173 rural households in two tribal wards of KwaZulu-Natal. Although 35 percent of sampled households had stunted children, and 10 percent of households (from the same households) had underweight children, results show that, 'households which participate seriously in agricultural activities have better nutritional status' (Kirsten, *et al.*. 1998: 584). The participating households grew and sold a variety of crops and many kept livestock. In addition, the study found that households that purchased seed and used improved cultivation techniques had a lower probability of stunted children. Such households are likely to participate in production beyond the level of subsistence. The researchers concluded that improving agricultural productivity in less-developed areas of South Africa has potential to improve household and child nutritional status.

The 1999 South African National Food Consumption Survey was the first primary study to determine nutritional status in South Africa, although only for one population segment, namely children 1 - 9 years old. The study set out to determine the anthropometric status of a nationally representative, cross-section sample of children aged 1 - 9 years old, ascertain the children's usual food consumption patterns, nutrient intakes and the factors impacting on food consumption (Labadarios, undated; VIC, 2001). The cross-sectional sample of children was drawn from the 1996 census data. The final sample included 2894 children from 156 randomly selected enumerator areas. The survey found that stunting remains the most common nutritional disorder, affecting nearly 25 percent of children. Stunting is most prevalent on commercial farms, and in tribal and rural areas. Only five percent of children were found to be underweight (Labadarios, 1999, cited by VIC, 2001).

Table 3. A comparison of prevalence (% [1]) of stunting in Sekhukhuneland

	Sekhukhune FIVIMS 2004 (24-71 months)	Northern Province SAVACG1995 (6-71 months)	SA SAVACG 1995 (6-71 months)	SA NFCS 1999 (12-71 months)
Stunting (HAZ <-2SD)	36.6 (29.8-43.4)	34.2 (30.0- 38.4)	22.9 (21.4-24.5)	23.8 (21.9-25.8)
Underweight (WAZ <-2SD)	16.2 (11.0-21.4)	12.6 (9.9-15.2)	9.3 (8.5-10.1)	11.1 (9.7-12.5)
Wasting (WHZ <-2SD)	7.3 (3.6-11.0)	3.8 (2.9-4.7)	2.6 (2.2-2.9)	3.6 (2.7-4.4)
Overweight (WHZ >+2SD)	8.9 (4.9-12.9)	N.D.[3]	N.D.	N.D.

[1] Mean prevalence with 95% confidence interval in parentheses

[3] N.D. = not determined

Source: Compiled from various tables in a HSRC client report on FIVIMS in South Africa (HSRC, 2005)

The prevalence of stunting found for the 1999 NFCS was similar to the 1995 SAVACG survey but underweight and wasting increased slightly (Table 3). Two smaller studies render comparisons of data over time. Jinabhai, *et al.*. (2004) have shown that the prevalence of stunting and wasting among KIDS sample households (a panel sample comprised of SAVACG sample households) increased between 1994 and 1998 (Table 4) while the prevalence of stunting in Sekhukhuneland in 2004 was found similar to the prevalence of stunting observed in the Northern province (where the sampling frame included Sekhukhuneland) during the 1995 SAVACG study.

Table 4. Prevalence of under -nutrition (KIDS 1994 and 1998)

Age of children	Survey round	Prevalence of stunting (per cent of sample)		Prevalence of wasting (per cent of sample)	
		Boys	Girls	Boys	Girls
4 -5 years	1994	8,0	6,0	4,8	3,0
	1998	23,6	23,4	5,2	7,1
8–11 years	1994	20,6	17,0	9,7	7,0
	1998	28,4	26,8	7,3	7,2

Source: Jinabhai, *et al.* 2004

The mean energy intake of children in all provinces for the 1999 NFCS was below that recommended for age, while protein intakes were above the RDA for all groups and in all provinces. However, the energy distribution between protein, carbohydrate and fats in terms of energy intake was skewed to carbohydrates, which formed more than the recommended 65 percent for the children's diets. The sample children's height-

for age and height-for weight ratios were significantly correlated to their intake of animal protein, while their energy intakes were significantly related to the presence of stunting and underweight. Overall, most children consumed a diet deficient in energy and of poor nutrient density. The study found that subsistence agriculture is not a major source of foods in South Africa. Household income was found to be a decisive factor in the consumption and procurement of foods. The study concluded that half the surveyed households experienced hunger, a quarter was at risk of hunger and a quarter was classified as food insecure.

Although South Africa has the lowest prevalence of underweight preschoolers (9%) compared with other African countries, stunting remains unacceptably high (23%) (Steyn, *et al.*. 2001). In sum, the studies summarized here have indicated that rural African households show the highest rates of stunting among children, a fair proportion of underweight children, and inadequate intakes of energy; fat; protein; calcium; vitamins A, B6, and C; iron and zinc. This confirms Kirsten, *et al.*'s. (1998) finding that agricultural activities only have positive and significant nutritional benefits for households who are 'seriously' involved in agricultural activities. Subsistence agriculture and communal vegetable gardening may have benefits for slight improvement in micronutrients status but do not yield sufficient produce to improve the energy intake of household members. The findings of these studies concur with the findings of a national survey on the impact of agricultural deregulation (ECI, 2003) that income remains the single most important determinant of a household's ability to meet its food security needs. Even where agriculture produces additional income or income replacements (as surmised by Schmidt and Vorster, 1995), there is no guarantee that increases to income would automatically be spent on acquisition of more food, a wider variety of foods and/or foods of greater energy density. It is therefore important to explore the consumption patterns of South Africa's rural populations to determine how any income savings or income earned through agricultural production would be spent.

Review of rural household consumption patterns in South Africa

A number of consumption studies have been conducted in rural areas in South Africa. Van Seventer's (1987) study of income redistribution to black South Africans show that increases in income usually lead to an increase in demand for food and semi-durables. However, other local studies of small farm households (Nieuwoudt and Vink, 1989; Van Zyl, *et al.*. 1991; Belete, *et al.*. 1999) have found the demand for food less responsive to changes in income than demand for other products. More specifically, Nieuwoudt and Vink (1989) and Van Zyl, *et al.*. (1991) found that increases in rural

incomes are roughly twice as likely to be spent on vegetables, fruit and meat, household durables and semi-durables (e.g. clothing) as on maize, the staple food in many rural areas. Van Rooyen and van Zyl (1990) report that grain and grain products (e.g. bread) have lower income elasticities than other food commodities, while meat and vegetable products have greater potential for increased consumption amongst black consumers (van Rooyen and van Zyl, 1990). Van Rooyen and van Zyl (1990) estimate that increases of 10 percent in expendable incomes of black consumers could result in consumption increases of 11.9 percent and 14.6 percent for meat and vegetables respectively.

Increased real incomes could alter rural consumption patterns, but demand for food (especially staples) would increase less than demand for more luxury goods such as clothing (Nieuwoudt and Vink, 1989; van Zyl, *et al.*. 1991; Belete, *et al.*. 1999). Evidently rural households display a preference for imported goods (van Zyl *et al.*. 1991). Nevertheless, since the demand for locally produced food, goods and services is relatively income elastic, and as most rural households have access to farmland (Thompson and Lyne, 1993), increased agricultural incomes could have direct and indirect nutritional benefits for rural populations.

The findings of these studies are confirmed by Hendriks and Lyne's (2003a) expenditure study of sample households in KwaZulu-Natal (Hendriks and Lyne, 2003a). Expenditure on food accounted for the greatest share of total household expenditure. The corresponding elasticities are 1.09 and 0.98, indicating that expenditure on food in both districts varies in almost direct proportion to a small change in household income.

The results show that expenditure on staple foods would remain virtually unchanged or possibly decrease as household incomes rise. For root crops the expenditure elasticity is also negative. Although sample households in both districts consumed similar amounts of root crops per capita, the relatively poorer Swayimana households spent a higher proportion of their total household expenditure on root crops than did Umzumbe households.

A similar trend holds for wheat products (bread and flour), with an expenditure elasticity of 0.436 in Swayimana and -0.315 in Umzumbe. Overall, the elasticities show little chance of increased demand for staple crops, should incomes rise. The equation estimated for meat, meat products and poultry included all meat, processed meat products and poultry, but excluded eggs. Elasticities of 0.996 and 1.044 were computed for Swayimana and Umzumbe respectively, suggesting that an increase in income would result in a proportionate increase in demand for meat and poultry

products. For poor households, it may have been expected that an increase in income would result in a proportionally larger increase in meat consumption. A possible explanation for this anomaly is the fact that sample households lacked storage (refrigeration) facilities for these highly perishable products, making consumption response less elastic.

The results also indicate a possible dramatic increase in expenditure on horticultural products (fresh and processed fruit and vegetables) in response to higher incomes, with elasticities of 7.91 and 4.56 for Swayimana and Umzumbe respectively. The strong likelihood that the consumption of fruit and vegetables will increase substantially with increased income concurs with the findings of Nieuwoudt and Vink (1989) and van Zyl, *et al.*. (1991). In conclusion, there is little possibility of income-induced growth in the demand for food, except for horticultural products, and to a lesser extent for meat, meat products. For these two categories, the elasticities indicate likely growth as income increases. Increased consumption of these foods would have significant benefits for rural diets.

Agriculture could ensure a more stable food supply and improve nutrition at household level, both directly through improved dietary diversity and increased macronutrient intake, and indirectly through income replacement behaviour that seems to have a greater impact on improving energy intakes among South Africa's rural population. The magnitude of the nutritional benefits seems primarily based on whether the scale of production is beyond subsistence level. The net social benefits of improved nutrition are undisputed. Improved nutrition leads to greater production capacity, improved ability to benefit from education that increases access to information (agricultural and nutritional), and improved health and resistance to disease.

CONCLUSIONS

Improved nutrition is clearly a positive externality for increased agricultural production in South Africa's rural areas. However, the scale of agricultural production strongly determines the magnitude of these nutritional benefits. To have a significant impact on the food security and nutritional status of rural populations, agricultural production must develop beyond the subsistence level. While production for home consumption increases the availability of vegetables and increases micronutrient intake, the income 'savings' derived from home production seems to have more positive influences on the nutritional status of rural populations. Income replacement leads to increased purchases of energy-dense foods such as fats, oils and meat.

Various South African expenditure studies confirm that increased household incomes are likely to increase local demand for meat, poultry, vegetables and fruit, which would significantly and positively influence food intake. While increased micronutrients have undisputed benefits for nutrition, increased protein and energy from fats and meat would contribute more significantly to reducing South Africa's unacceptably high rate of stunting among children, while simultaneously benefiting micronutrient deficiencies. Increased incomes from agricultural sales are also likely to lead to increased dietary diversity, increasing the nutritional adequacy of rural diets. Improved nutrition would lead to a number of additional positive benefits related to improved health, resistance to disease, increased productivity and improved human capacity.

Such benefits from agricultural production seem evident only if households are actively and productively engaged in agriculture above the level of subsistence. The following conditions are necessary for reaping widespread benefits from agriculture in South Africa's rural communities:

- Benefits from agriculture are most likely only to accrue if the supply of nontradables is price elastic, and households engage in agriculture at a level beyond subsistence.
- Given the poor incentives for increased agricultural production, an increase in household level incentives is needed to encourage greater participation in expanding the production of farm tradables. The prospects of additional income and reasonable returns from improved agricultural production are needed and could be found in supportive agricultural services, accessible and affordable inputs and technology.
- To ensure wide benefits from agricultural production, it is necessary that markets exist for the sale of smallholder produce. This requires the existence of a number of infrastructural provisions such as transport, and access to inputs, information and technology, and reduction of transaction costs especially for nontradables. In addition, smallholder and/or emerging farmers need access to lucrative, efficient markets and adequate storage to minimise losses for the benefit of increased production to impact on the poor.
- The nutritional benefits of agriculture will only remain positive if the dietary changes that do occur comply with dietary guidelines. Trends such as urbanisation and consumer preference for convenience foods (such as rice over maize), threaten the beneficial characteristics of traditional rural diets (usually low in fat and animal

protein), compromising the health of rural and migrating populations and exposing them unduly to health risks.

- Consumer preferences for commercial goods require behavioural changes to ensure maximum realisation of the nutritional benefits of agriculture-led growth. Effective promotion of the value of agriculture and the savings of home production should be part of any food security and/or poverty alleviation strategy (Hendriks, 2003). .

All these conditions require sustained and coordinated action on the part of policy-makers responsible for the provision of agricultural services, information and education with the necessary infrastructural support.

ACKNOWLEDGMENT

This article is based on Vink & Kirsten (2003) and is part of the Roles of Agriculture (ROA) Project, which is funded through a trust fund from the Government of Japan and is run by the Agricultural and Development Economics Division of the Food and Agriculture Organisation (FAO) of the United Nations (www.fao.org/es/esa).

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